CHROMOSOME NUMBERS IN THE COMPOSITAE. VII. ADDITIONAL SPECIES FROM THE SOUTHWESTERN UNITED STATES AND MEXICO

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The present contribution is essentially a continuation of several papers, the latest of which (Turner *et al.*, 1962) dealt with chromosome counts from species of southern Mexico; except for the 25 species from the United States, the counts reported in the present paper were obtained from a wide area of Mexico.

Chromosome counts were made from pollen-mother-cell squashes as outlined by Turner and Johnston (1961). Voucher specimens (table 1) are deposited at The University of Texas Herbarium; these all were collected during the years 1961–62. The tribal and subtribal arrangements listed in Table 1 follow those of Hoffman (1894). The identifications are our own, except for several which were kindly made by Arthur Cronquist and Kittie Parker. This study has been supported by National Science Foundation Grant 1216.

EUPATORIEAE. *Ageratum* (x = 10). Chromosome counts for the species of this genus are consistent with the basic number obtained by other workers. Both diploid and tetraploid collections of several species of *Ageratum* have been reported. The three species listed in Table 1 are all diploid (n = 10); collections of these same species were reported by Turner *et al.* (1961a) as tetraploids (n = 20).

Conoclinium greggii (n = 10). This genus is often included as a section of *Eupatorium* (Fernald, 1950; Hoffmann, 1894), but is treated as a separate genus by Small (1933) and others. The only other count for the genus has been that of Grant (1953) who reported *C. coelestinum* as diploid with 2n = 20.

Eupatorium (x = 10, 17). *E. prunellifolium* (n = 52 univalents). Turner *et al.* (1961a) reported a meiotic count of 50 asynaptic chromosomes for this species. Basic chromosome numbers of x = 10 and 17 have been reported for the section Eximbricata to which this species belongs (Grant, 1953). Thus, *E. prunellaefolium* is either a triploid on a base of x = 17, the two numbers 50 and 52 being aneuploid derivatives from 2n = 51, or else it is on a base of x = 10, the present count being an aneuploid derivative from what might be an apomictic pentaploid. The authors prefer the former interpretation since at least one triploid species on a base of x = 17 is known for the section Eximbricata (Grant, 1953), while asynaptic pentaploids are unknown for the genus; however, Turner *et al.* (1961a), reported the chromosome number of *E. patzcuarensis* as n = 25 bivalents; the latter is apparently a pentaploid on a base of x = 10 (i.e. 2n = 50).

Stevia (x = 11, 12, 17). Previous published counts for this multibasic genus have been on a base of x = 11 (Darlington and Wylie, 1956) and

FIGS. 1–12. Meiotic chromosomes of species of Compositae, × *ca.* 2000: 1, *Eupatorium prunellaefolium* (n = 52 univalents); 2, *Stevia elatior* (n = 34 univalents); 3, *S. lucida* (n = 12); 4, *S. salicifolia* (n = 12); 5, *S. viscida* (n = 11); 6, *Aphanostephus ramosus* (n = 4 + 1 univalent); 7, *Croptilon divaricatum* (n = 4); 8, *Grindelia oxylepis* var. *eligulata* (n = 6); 9, *Gutierrezia glutinosa* (n = 4); v0, *Haplopappus gracilis* (n = 2); 11, *Isocoma veneta* (n = 6); 12, *Milleria quinqueflora* (n = 15).

x = 17 (Turner *et al.*, 1961a). Chromosome numbers for all seven species listed in Table 1 are first reports. Three of the species had asynaptic chromosomes at meiosis I (n = 34 univalents) while one species, *S. purpurea,* had meiotic configurations showing a variable number of bivalents and univalents.

ASTEREAE. *Croptilon divaricatum* (n = 4). This count agrees with an earlier report for the species by Turner and Ellison (1960); however Jackson (1959) reported a count of 2n = 10 from a population in Kansas. Shinners (1950) recognizes several varieties for the species; both of the n = 4 counts were more from the typical variety (var. *divaricatum*); Jackson's count was apparently obtained from the variety *hookerianum* as treated by Shinners.

Chromosome numbers for *Aphanostephus* (n = 4), *Baccharis* (n = 9), *Conyza* (n = 9, 27), *Erigeron* (n = 9, 18), *Grindelia* (n = 6), *Gutierrezia* (n = 4), *Haplopappus* (n = 2), *Heterotheca* (n = 9), *Isocoma* (n = 6) and *Townsendia* (n = 9) are consistent with previous basic chromosome counts established for these genera (Darlington and Wylie, 1956; Raven *et al.*, 1960; Cave, 1960).

INULEAE. The meiotic counts of *Gnaphalium* (n = 7, 14) listed in Table 1 are consistent with the basic number (x = 7) established for the genus by other workers (Darlington and Wylie, 1956).

HELIANTHEAE. Millerinae. This subtribe contains 16 genera; the count for *Milleria quinquefolia* (n = 15) is the first genus in the group to be counted.

Zinninea. Chromosome counts for the species of *Sanvitalia* and *Zinnia* are consistent with counts previously reported for members of these taxa. *Zinnia angustifolia* is apparently dibasic, consisting of populations with n = 12 and n = 11 (Turner *et al.*, 1961a, 1962; present paper).

Verbesininae. *Geraea canescens* (n = 18). This is the first chromosome count for the genus. Chromosome counts for the four species of *Simsia* (x = 17), listed in Table 1 were all diploid with n = 17; the genus is apparently unibasic, in that at least 7 of its approximately 25 species are diploid with this n number (Turner *et al.*, 1961b). Gray (1849) included *Geraea* in *Simsia* but Blake (1913) recognized the genera as distinct.

Chromosome counts for *Melanthera* (x = 15) and *Perymenium* (x = 15) are consistent with previous basic numbers established for these genera (Turner *et al.*, 1961b, 1962). *Viguiera deltoidea* (n = 18) was also reported as n = 18 by Heiser (1960). Chromosome counts for the two species of *Zaluzania* agree with the established base numbers of x = 16 and 18 (Turner, *et al.*, 1961a).

Coreopsidinae. *Bidens pilosa* (x = 12, 14). A single collection of *Bidens pilosa* var. *radiata* was found to be diploid with n = 14 bivalents. At least 8 collections for this widespread variety have been found to be diploid with n = 12 (including the seven counts listed in table 1). The meiotic figure with n = 14 appeared unequivocal (fig. 16), although

FIGS. 13–24. Meiotic chromosomes of species of Compositae, × *ca.* 2000: 13, *Zinnia* cf. *leucoglossa* (n = 11); 14, *Geraea canescens* (n = 18); 15, *Bidens* cf. *reptans* (n = 11); 16, *B. pilosa* var. *radiata* (n = 14); 17, *Chrysanthellum mexicanum* (n = 8); 18, *Baileya multiradiata* (n = 16); 19, *Hymenoxys acaulis* (n = 14); 20, *Laphamia lindheimeri* (n = 18); 21, *Psilostrophe villosa* (n = 17); 22, *Bartlettia scaposa* (n = 11); 23, *Pseudoclappia arenaria* (n = 18 ± 1); 24, *Senecio filifolius* (n = 20).

some of the cells observed might have been interpretable as n = 13. Approximately 22 species of *Bidens* have been studied chromosomally; they form an aneuploid series with numbers of n = 10, 11, 12 and 14.

Chrysanthellum mexicanum (n = 8). This is the first chromosome count for this genus and is the lowest basic number reported for the subtribe Coreopsidinae; the only other taxon with a base of x = 8 is the multibasic species *Thelesperma filifolium* with numbers of n = 8, 9, and 11 (Melchert, personal communication). Chromosome counts of *Coreopsis* (n = 12), and *Cosmos* (n = 12) are consistent with basic numbers previously reported (Darlington and Wylie, 1956). A single collection of *Cosmos bipinnatus* was found to be diploid with n = 11, this being a new basic number for the genus. Crowe (1954) had reported a count of 2n = 24 for this species.

Galinsoginae. Chromosome counts listed in Table 1 for the genus *Bebbia* (n = 9) are first reports.

Calea (x = ca. 16, 18). Turner *et al.* (1961b; 1962) reported counts of x = ca. 16 and x = 18 for this genus. The count for *C. urticifolia* (n = 19) adds yet another chromosome number to the genus. *Calea scabra* (n = 32), is apparently a polyploid on a base of x = 16.

Sabazia (x = 4). First reports for three species of *Sabazia* (x = 4) are listed in Table 1. Two of these taxa, *S.* cf. *liebmannii* (n = 24) and *S.* cf. *michoacana* (n = 24) are apparently dodecaploids, and one taxon, *Sabazia* sp. (n = 8), is a tetraploid. The only previous reports for the genus are n = 4 for *S. humilis* and n = 18 for *Sabazia* sp. (Turner and Johnston, 1961; Turner *et al.*, 1962).

HELENIEAE. *Hymenoxys odorata* (n = 11, 15). This species apparently consists of races with at least 2 chromosome numbers (table 1). Turner (1963) reported several collections from Northeastern Mexico as n = 15; collections from the United States however have all been diploid with n = 11 (Speese and Baldwin, 1952; Raven and Kyhos, 1961; present paper). The morphological differences, if any, which mark the races do not appear significant.

Hymenoxys acaulis (n = 14). Previous reports for the genus *Hymenoxys* have all been on a base of x = 11 or 15. The present count was unequivocal and was observed in numerous cells. While a newly discovered chromosome number for a taxon that was believed to be constant for such a character might prove vexing, it none-the-less can be expected to occur from time to time in various taxa when a more extensive sampling is undertaken. Several such examples in the experience of the junior author could be cited and such reports are becoming increasingly common in the literature.

Psilostrophe villosa (n = 17). Previous species counts for this genus have all been diploid with n = 16. The present count appeared unequivocal (fig. 21) and was obtained from a number of cells from different bud material taken from the same population.

Laphamia lindheimeri (n = 18). Raven and Kyhos have reported another species (*L. congesta*) as diploid with n = 32.

Chromosome numbers for *Baileya* (n = 16), *Bahia* (n = 8, 12, and 11), *Chaenactis* (n = 5, 8), *Chrysactinia* (n = 15), *Flaveria* (n = 18), *Gaillardia* (n = 17), *Dyssodia* (n = 13, ca. 26), *Nicolletia* (n = 10), *Pectis* (n = 12, ca. 24), *Porophyllum* (n = 12), *Sartwellia* (n = 18), and *Tagetes* (n = 24) are consistent with basic numbers previously reported (Ellison, 1961; Raven and Kyhos, 1961; Turner and Johnston, 1961; Johnston and Turner, 1962; Turner *et al.*, 1961a; 1961b).

SENECIONEAE. *Bartlettia* (n = 11). This count is a first report for the genus.

Pseudoclappia arenaria (n = 18 ± 1); *Clappia suaedifolia* (n = 16). Rydberg (1923) placed *Pseudoclappia* in the tribe Senecioneae, subtribe Senecioninae. He considered its relationship with the genus *Clappia* but noting, in particular, the resin glands which are found on the involucre and upper leaves of this latter taxon, he placed the two genera in separate tribes relegating *Clappia* to the tribe Tageteae.

Rydberg retained *Clappia* in the subtribe Jauminae for his treatment in the North American Flora. In his 1923 discussion, he gave as a reason for this earlier disposition the following: ". . . I was not so well acquainted with the variations displayed in the subtribe Tagetinae, and let it remain in the position given by Gray and Hoffman [*sic.*], though I felt that it was out of place." Raven and Kyhos (1961) also remarked on the anomalous position of *Clappia* if placed in the subtribe Jauminae, although they suggested no alternative position.

We are inclined to agree with Rydberg's later disposition of *Clappia* as well as his observations concerning the position of *Pseudoclappia*. We would go further however and suggest that there is a relatively close relationship between *Clappia* and *Pseudoclappia* and that while they might belong to different tribes, they probably do tie the Tagetinae with the Senecioneae in a phyletic sense and it might be both more expedient and more natural, to include the tribe Tageteae as a subtribe within the Senecioneae.

In this connection, it seems worthwhile to consider the small genus *Varilla,* which is also found in northeastern Mexico and adjacent Texas. Its position in the Compositae is also anomalous, being placed in the Heliantheae by Gray and others, probably because of its chaffy receptacle. *Clappia, Pseudoclappia* and *Varilla* are alike in their succulent habits, distribution, and ecology (all are characteristic of saline or brackish flats of northeastern Mexico and Texas). While the morphological similarities, particularly in the case of *Varilla* may be more superficial than real, we believe that serious consideration should be given the possibility of a closer relationship among themselves than has heretofore been assumed.

MUTISIEAE. *Trixis* (x = 27). The chromosome number for *Trixis californica* (n = 27) agrees with previous reports (Turner *et al.*, 1962).

CICHORIEAE. Chromosome counts for *Hieracium* (n = 9), *Malacothrix* (n = 7), and *Pinaropappus* (n = 18) agree with the basic numbers established for these genera by other workers (Darlington and Wylie, 1956; Stebbins *et al.*, 1953).

Table 1. Species of Compositae Examined for Chromosome Number

Species	Location and Voucher	n Number
	EUPATORIEAE	
Ageratum albidum (DC.) Hemsl.	59 m s of Tehuacan, Oaxaca. *666*[1]	10
A. cf. corymbosum Zucc.	45 mi w of Sahuayo, Jalisco. *841*	10
A. salicifolum Hemsl.	6 mi w of Guadalajara, Jalisco. *866*	10
Conoclinum greggii Gray	60 mi e of San Pedro de las Colonias, Coahuila. *522*	10
Eupatorium prunellifolium H. B. K.	27 mi s of Mexico City, Mexico. *745*	52 (fig. 1) univalents)
Stevia elatior H. B. K.	Along route 190, 40 mi e of junction of 125–190, Oaxaca. *669*	17 (fig. 2) 34 univalents)
S. lucida Lag.	53 mi s of Tehuacan, Oaxaca. *665*	12 (fig. 3)
S. purpurea Pers.	15 mi n of Cuernavaca, Morelos. *375*	17 ($2–8_{II}$, $30–18_{I}$)
S. rhombifolia H. B. K.	Llano Grande, Mexico. *Rock M—352*	17 (34 univalents)
S. salicifolia Cav.	4 mi e of Majalca, Chihuahua. *Ellison 148*	12 (fig. 4)
S. serrata Cav.	Along route 55, 3 mi from junction with route 57. *583*	17 (34 univalents)
	10 mi w of Toluca, Mexico. *794*	17 (34 univalents)
	10 mi e of Puebla, Puebla. *623*	17 (34 univalents)
	Huehuetenango, Guatemala. *King 3412*	17 (34 univalents)
S. viscida H. B. K.	6 mi w of Guadalajara, Jalisco. *868*	11 (fig. 5)
	ASTEREAE	
Aphanostephus cf. pachyrrhizus Shinn.	8 mi ne of Tepeaca, Puebla. *633*	4
A. ramosus (DC.) Gray	2 mi w of Hidalgo, Michoacan. *815*	4 + 1 univalent (fig. 6)
Baccharis sordescens DC.	5 mi n of Chilpancingo, Guerrero. *Johnston 6002*	9
Conyza bonariensis (L.) Cronq.	54 mi n of Acapulco, Guerrero. 782	*ca.* 27
C. coronopifolia H. B. K.	12 mi n of Cuernavaca, Morelos. *720*	9
C. gnaphaloides H. B. K.	10 mi e of Puebla, Puebla. *628*	*ca.* 9
Croptilon divaricatum (Nutt.) Raf.	Eldorado, Union Co., Arkansas. *Turner 4854*	4 (fig. 7)
Erigeron affinis DC.	9 mi s of Victoria, Tamaulipas. *King 4537*	9
E. delphinifolius var. *oreophilus* (Greenm.) Cronq.	14 mi sw of Chihuahua City, Chihuahua. *978*	9

[1] Collection numbers are those of Powell and Edmundson unless otherwise indicated.

Species	Location and Voucher	n Number
Erigeron sp.	14 mi sw of Chihuahua City, Chihuahua. *797*	18
E. sp.	22 mi e of San Luis Potosi, San Luis Potosi. *550*	9
Grindelia inuloides Willd.	29 mi s of toll gate, n of Mexico City, Mexico. *585*	6
G. oxylepis var. eligulata Steyerm.	12 mi s of Saltillo, Cohuila. *527*	6 (fig. 8)
G. robinsonii Steyerm.	3 mi s of San Luis Potosi, San Luis Potosi. *553*	6
Gutierrezia glutinosa (Schauer) Sch. Bip.	Cuahutemoc, Chihuahua. *986*	4 (fig. 9)
Haplopappus gracilis (Nutt.) Gray	53 mi s of Parral, Chihuahua. *963*	2
	14 mi sw of Chihuahua City, Chihuahua. *980*	2 (fig. 10)
Heterotheca inuloides Cass.	10 mi s of Apam, Hidalgo. *608*	9
Isocoma heterophylla (Gray) Greene	2 mi nw of Pecos, Reeves Co., Texas. *Ellison 174*	6
I. veneta (H. B. K.) Greene	Along route 85, *ca.* 20 mi n of route 30, Mexico. *596*	6 (fig. 11)
	3 mi s of San Luis Potosi, San Luis Potosi. *554*	6
*Townsendia mexi*cana Gray	12 mi s of Saltillo, Coahuila. *530*	9
	INULEAE	
Gnaphalium cf. leptophyllum DC.	20 mi n of route 30, Mexico. *601*	*ca.* 7
	12 mi n of Cuernavaca, Morelos. *721*	14
G. sp.	10 mi ne of Oaxaca, Oaxaca. *677*	7
	HELIANTHEAE. MILLERINAE	
Milleria quinqueflora L.	45 mi w of Sahuayo, Jalisco. *845*	15 (fig. 12)
	MELAMPODINAE	
Parthenium fruticosum Less.	3 mi e of the San Fernando-Santander highway on road to Loreto, Tamaulipas. *Johnston 5592*	18
	ZINNINAE	
Sanvitalia ocymoides DC.	12 mi s of Saltillo, Coahuila. *525*	*ca.* 16
S. cf. procumbens L.	4 mi s of Villa Hidalgo, San Luis Potsoi. *547*	8
S. sp.	Along route 190, 40 mi e of junction of 125–190, Oaxaca. *671*	8
Zinnia angustifolia H. B. K.	20 mi s of Guadalajara, Jalisco. *861*	11
Z. haageana Regel	5 mi w of Morelia, Michoacan. *826*	11 ± 1
Z. cf. leucoglossa Blake	30 mi w of Tequila, Jalisco. *893*	11 (fig. 13)
Z. tenella Robinson	30 mi w of Tequila, Jalisco. *892*	11+ 1 or 2 fragments

Species	Location and Voucher	n Number
	VERBESININAE	
Geraea canescens T. & G.	Dateland, Yuma Co., Arizona. *Turner 4754*	18
	16 mi e of Brawley, Imperial Co., California. *Turner 4762*	18 (fig. 14)
Melanthera angustifolia A. Rich.	Along route 144, 21 mi sw of junction of 140–144, Vera Cruz. *642*	15
Perymenium flexuosum Greenm.	12 mi n of Cuernavaca, Morelos. *731*	*ca.* 30
P. hypoleucum Blake	53 mi s of Tehuacan, Oaxaca. *659*	*ca.* 45
Simsia foetida (Cav.) Blake	3 mi s of Huehuetenango, Guatemala. *King, 3415*	17
	Along route 85, 20 mi n of route 30, Mexico. *599*	17
	Along route 85, 20 mi n of route 30, Mexico. *603*	17
S. lagasciformis DC.	22 mi ne of Tepeaca, Puebla. *640*	*ca.* 17
S. cf. megacephala Sch.-Bip.	Cuahutemoc, Chihuahua. *998*	17
S. triloba Blake	14 mi w of Zamora, Michoacan. *840*	17
Viguiera deltoidea var. *parishii* (Greene) Vasey & Rose	4 mi e of Jacumba, San Diego Co., California. *Turner 4773*	18
Zaluzania globosa Sch.-Bip.	Along route 85, 20 mi n of route 30, Mexico. *597*	*ca.* 16
Z. montagnifolia Sch.-Bip.	Tehuacan, Puebla. *King 2645*	17 ± 1
Z. robinsonii Sharp	31 mi s of Galeana, Nuevo Leon. *Johnston 5857*	18
	COREOPSIDINAE	
Bidens cf. aurea (Ait.) Sherff	2 mi w of Hidalgo, Michoacan. *819*	24
B. cf. reptans (L.) G. Don.	22 mi ne of Tepeaca, Puebla. *638*	11
	22 mi ne of Tepeaca, Puebla *641*	11 (fig. 15)
B. pilosa var. *bimucronata* (Turcz.) Schulz	Cuahutemoc, Chihuahua. *992*	12
	10 mi w of Toluca, Mexico. *793*	12
	38 mi s of San Luis Potosi, San Luis Potosi. *572*	12
	17 mi s of Huatusco, Vera Cruz. *643*	12
B. pilosa var. *minor* (Blume) Sherff	14 mi sw of Chihuahua, Chihuahua. *977*	12
B. pilosa L. var. *pilosa*	54 mi n of Acapulco, Guerrero. *778*	36
B. pilosa var. *radiata* Sch.-Bip.	65 mi n of Acapulco, Guerrero. *787*	12
	Along route 57, 29 mi s of toll gate, n of Mexico City, Mexico. *586*	12
	24 mi n of Cuernavaca, Mexico. *738*	12
	10 mi w of Toluca, Mexico. *792*	12
	8 mi e of Morelia, Michoacan. *Ellison 101*	14 (fig. 16)
	8 mi ne of Tepeaca, Puebla. *635*	12
	22 mi ne of Tepeaca, Puebla. *637*	12
	17 mi s of Huatusco, Vera Cruz. *644*	12

Species	Location and Voucher	n Number
Chrysanthellum mexicanum Greenm.	5 mi w of Morelia, Michoacan. *831*	8 (fig. 17)
Coreopsis cyclocarpa Blake	6 mi w of Guadalajara, Jalisco. *863*	12
Cosmos bipinnatus Cav.	4 mi w of El Palmito, Sinaloa. *925*	11
C. parviflorus (Jacq.) Pers.	Cuahutemoc, Chihuahua. *990*	12
	GALINSOGINAE	
Bebbia juncea Greene	35 mi w of El Centro, Imperial Co., California. *Turner 4778*	9
	20 mi nw of Yuma, Mohave Co., Arizona. *Turner 4784*	9
Calea scabra (Lag.) Rob.	12 mi n of Cuernavaca, Morelos. *719*	32
C. urticifolia (Mill.) DC.	10 mi se of Jalopa, Vera Cruz. *Johnston 4797*	9
Sabazia cf. liebmannii Klatt	10 mi ne of Oaxaca, Oaxaca. *674*	24
	25 mi w of Oaxaca. Oaxaca. *706*	24
S. cf. michoacanna Rob.	Along route 190, 40 mi e of junction of 125–190, Oaxaca. *673*	24
S. sp.	4 mi w of El Palmito, Sinaloa. *920*	8
	HELENIEAE	
Baileya multiradiata Torr.	6 mi s of Van Horn, Culberson Co., Texas. *Turner 4739*	16 (fig. 18)
Bahia glandulosa Greenm.	14 mi w of Durango, Durango. *939*	12
B. schaffneri S. wats.	4 mi e of San Luis Potosi, San Luis Potosi. *548*	8
B. xylopoda Greenm.	Along route 115, 5 mi s of junction of routes 115–130, Hidalgo. *605*	11 + 1 fragment
Chaenactis carphoclinia var. *attenuata* (Gray) Jones	12 mi e of Glamis, Imperial Co., California. *Turner 4765*	8
C. stevioides H. & A.	25 mi w of Deming, Luna Co., New Mexico. *Turner 4745*	5
Chrysactinia pinnata Wats.	23 mi s of Sabinas Hidalgo, Nuevo Leon. *Johnston 5458*	15
Dyssodia pinnata (Cav.) Rob.	Intersection of 136 and 57, Hidalgo. *Ellison 92*	13
	10 mi w of Toluca, Mexico. *803*	13
D. porophylloides Gray	35 mi w of El Centro, Imperial Co., California. *Turner 4780*	13
D. setifolia Lag.	15 mi s of Saltillo, Coahuila. *536*	*ca.* 26
	28 mi ne of San Luis Potosi, San Luis Potosi. *Ellison 62*	*ca.* 26
Flaveria ramosissima Klatt	39 mi s of Saltillo, Nuevo Leon. *542*	18
Gaillardia pinnatifida Torr.	Intersection of 97 and 2009, Floyd Co., Texas. *179*	17
G. pinnatifida var. *linearis* (Rydb.) Bidd.	Cuahutemoc, Chihuahua. *989*	17
Hymenoxys acaulis (Pursh) Parker	Palo Duro Canyon, Randall Co., Texas. *Turner 4847*	14 (fig. 19)

Species	Location and Voucher	n Number
Hymenoxys cf. linearifolia Hook.	5 mi se of Valentine, Jeff Davis Co., Texas. *Turner 4737*	15
H. odorata DC.	5 mi se of Valentine, Jeff Davis Co., Texas. *Turner 4735*	11
	25 mi ne of Yuma, Mohave Co., Arizona. *Turner 4785*	11
	5 mi s of Quitaque, Briscoe Co., Texas. *Melchert 177*	11
	12 mi s of Saltillo, Coahuila. *528*	15
Nicolletia edwardsii Gray	60 mi e of San Pedro de las Colonias, Coahuila. *523*	10
Laphamia lindheimeri Gray	Edge Falls, 5 mi s of Kendalia, Kendall Co., Texas. *Johnston 6494*	18 (fig. 20)
Pectis depressa Fern.	16 mi w of Acapulco, Guerrero. *768*	12
P. latisquama Sch.-Bip.	10 mi e of Puebla, Puebla. *King 3557*	*ca.* 24
P. saturejoides (Mill.) Sch.-Bip.	19 mi w of Oaxaca, Oaxaca. *702*	12
P. cf. texana Cory	8 mi nw of Royalty, Ward Co., Texas. *Melchert 252*	12
P. tenella DC.	7 mi n of La Gloria, Nuevo Leon. *Johnston 4587A*	12
Porophyllum coloratum (H. B. K.) DC.	7 mi e of Tierra Blanca, Oaxaca. *711*	12
	13 mi w of Orizaba, Vera Cruz. *Johnston 4779*	12
P. ervendbergii Gray	15 mi e of Ciudad del Maiz, San Luis Potosi. *Johnston 5666A*	12
P. scoparium Gray	37 mi s of Monclova, Coahuila. *511*	12
Psilostrophe cooperi (Gray) Greene	15 mi e of Tucson, Pima Co., Arizona. *Turner 4750*	16
P. villosa Rydb.	12 mi n of Matador, Motley Co., Texas. *Melchert 183*	17 (fig. 21)
Sartwellia mexicana Gray	30 mi s of Matehuala, San Luis Potosi. *Ellison 59*	18
Tagetes cf. elongata Willd.	Ixtlan de Juarez, Oaxaca. *King 3508*	24
	SENECIONEAE	
Bartlettia scaposa Gray	23 mi e of Aldama, Chihuahua, *1019*	11 (fig. 22)
Clappia suaedifolia Gray	25 mi e of General Bravo, Nuevo Leon. *Johnston 5324*	16
Pseudoclappia arenaria Rydb.	2 mi n of Pecos, Reeves Co., Texas. *Melchert & Powell 256*	18 ± 1 (fig. 23)
Senecio filifolium Nutt.	30 mi w of Chihuahua City, Chihuahua. *1007*	20 (fig. 24)
	4 mi e of San Luis Potosi, San Luis Potosi. *552*	20
S. monoensis Greene	10 mi sw 20 of Congress, Yavapai Co., Arizona. *Turner 4789*	20
Varilla texana Gray	22 mi w of China, Nuevo Leon. *Johnston 5012*	18

Species	Location and Voucher	n Number
	MUTISIEAE	
Trixis californica Kell.	35 mi w of El Centro, Imperial Co., California. *Turner 4779*	27
	CICHORIEAE	
Hieracium cf. crepidispermum Fries	12 mi n of Cuernavaca, Morelos. *722*	9
Malocothrix fendleri Gray	25 mi w of Deming, Luna Co., New Mexico. *Turner 4747*	7
Pinaropappus roseus Less.	8 mi ne of Tepeaca, Puebla. *634*	18

Summary

Chromosome counts are reported for 113 taxa (108 species in 56 genera) of Compositae from Mexico and the southwestern United States. Initial reports are included for 62 species, some of which belong to the following previously unreported genera: *Bartlettia* (n = 11), *Bebbia* (n = 9), *Chrysanthellum* (n = 8), *Geraea* (n = 18), *Milleria* (n = 15), *Clappia* (n = 16), *Pseudoclappia* (n = 18 ± 1), and *Varilla* (n = 18).

New basic numbers for the multibasic genera *Stevia* (x = 11, 12, 17), *Bidens* (x = 10, 11, 12, 14), *Calea* (x = 16, 18, 19), *Cosmos* (x = 11, 12), *Hymenoxys* (x = 11, 14, 15), and *Psilostrophe* (x = 16, 17) are reported.

The phylogenetic relationship of the three halophytic genera *Clappia, Pseudoclappia,* and *Varilla* is suggested as being closer than previously indicated by taxonomic dispositions.

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REVIEWS

California Spring Wildflowers. 122 pp., 96 color photographs, 173 line drawings, 2 maps. 1961. *California Desert Wildflowers.* 122 pp., 96 color photographs, 172 line drawings, 2 maps. 1962. *California Mountain Wildflowers.* 122 pp., 96 color photographs, 180 line drawings, 2 maps. 1963. All by Philip A. Munz. University of California Press, Berkeley and Los Angeles. Paper, $2.95 each; cloth, $4.95 each.

Death Valley Wildflowers. By Roxana S. Ferris. 141 pp., 144 species illustrated by line drawings. Death Valley Natural History Association, Death Valley, Calif. 1962. $1.75.

Ornamental Shrubs of California. By Leonid Enari. 214 pp., 181 figs. Ward Ritchie Press, Los Angeles. 1962. $5.95.

Staff members of the several herbaria in California devote much time attempting to meet the public's interest in California plants, both native and horticultural. Dominant among the queries received are those on plant identification. Not only does the layman want to know the names and characteristics of plants which interest him, frequently he wants to find these things out for himself. Yet there have been few nontechnical books available for the interested amateur to aid him in the identification of plants which are native to California, and there are fewer still to help him identify plants which have been introduced for horticultural use.

The republication in 1955, by the California Academy of Sciences, of Parsons' "The Wildflowers of California," first published in 1897, was a boon to those ama-